

Application No.: 10/065,711

Docket No.: JCLA9374

REMARKS

Present Status of the Application

The Office Action rejected all presently-pending claims 1-18. Specifically, the Office Action rejected claims 1, 3, 4, 10, 12-14 under 35 U.S.C. 102(b), as being anticipated by Adair (U.S. 5959325). The Office Action rejected claims 1-3, 5, 7-12, 14-16 under 35 U.S.C. 102(e), as being anticipated by Hwang (U.S. 6664028). The Office Action also rejected claim 6 under 35 U.S.C. 103(a) as being unpatentable over Adair in view of Furukawa (U.S. 6303272). The Office Action rejected claim 17 under 35 U.S.C. 103(a) as being unpatentable over Hwang in view of Ng (U.S. 5876903). The Office Action rejected claim 18 under 35 U.S.C. 103(a) as being unpatentable over Hwang and further in view of Furihata (U.S. 5618892).

Applicants have canceled claim 13, amended claims 1 and 10 and newly added claims 19-20. After entry of the foregoing amendments, claims 1-12, and 14-20 remain pending in the present application, and reconsideration of those claims is respectfully requested.

Discussion of Office Action Objections and Rejections

Applicants respectfully traverse the 102(b) rejection of claims 1, 3, 4, 10, 12-14 because Adair et al. (U.S. 5959325) does not teach every element recited in these claims.

In order to properly anticipate Applicants' claimed invention under 35 U.S.C. 102, each and every element of claim in issue must be found, "either expressly or inherently described, in a single prior art reference". "The identical invention must be shown in as complete details as is contained in the claim. Richardson v. Suzuki Motor Co., 868 F. 2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)." See M.P.E.P. 2131, 8th ed., 2001.

The present invention as defined in claim 1 is in general related a photolithography process for Mask ROM coding recites:

Claim 1. A photolithography process for Mask ROM coding, comprising:
providing a substrate having an array of memory cells thereon, *wherein the memory cells comprising a plurality of buried bit lines in the substrate, a plurality of word lines over the buried bit lines, and a plurality of channels between the buried bit lines;*
forming a first photoresist layer on the substrate covering the memory cells;

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performing a first exposure and development process to pattern the first photoresist layer into first line/space patterns, *wherein the first line/space patterns cover a portion of the channels;*

forming a second photoresist layer on the substrate covering the first line/space patterns;
and

performing a second exposure and development process to pattern the second photoresist layer into second line/space patterns having an orientation different from an orientation of the first line/space patterns, while *a plurality of coding windows are defined by the first line/space patterns and the second line/space patterns.*

Adair discloses a method for forming cornered images on a substrate having a deep trench structure therein (Fig. 31, col. 11, lines 28-37). The method includes forming a first layer 360 on a silicon nitride layer 350 in a regular grating pattern having lines running along either an arbitrary x-axis or y-axis (Fig. 33, col. 11, lines 52-56). After an etching process is performed, a second layer 380 is formed on the result structure in a non-grating pattern that resembles a "dog bone" shape (Fig. 35, col. 11, line 64 - col. 12, line 2). Adair does not disclose the method is used for Mask ROM coding. More specifically, Adair's reference lacks memory cells of Mask ROM and the feature of the coding window defined by two line/space patterns. Adair discloses the first layer is defined as running line patterns, and Adair fails to teach the first layer is defined to cover a portion of channels of memory cells that are located between buried bit lines.

Moreover, Adair discloses the second layer is defined as "dog bone" shape and intersecting to the patterns of the first layer. The pattern defined by the first layer and the second layer of Adair is a regulated pattern having square shape. Hence, the method of Adair can not be used for Mask ROM coding because coding windows of a Mask ROM may not be distributed uniformly.

The present invention of claim 10 is in general related a photolithography process for Mask ROM coding recites:

Claim 10. A photolithography process, comprising:

forming a first photoresist layer on a substrate;

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performing a first exposure and development process to pattern the first photoresist layer into first line/space patterns, *wherein the first line/space patterns include a plurality of trenches having different lengths;*

forming a second photoresist layer on the substrate covering the first line/space patterns;
and

performing a second exposure and development process to pattern the second photoresist layer into second line/space patterns having an orientation different from an orientation of the first line/space patterns, while a plurality of rectangle openings are defined by the first line/space patterns and the second line/space patterns.

The method disclosed by Adair does not disclose the first photoresist layer formed on a substrate is defined into line/space patterns including trenches having different lengths. Adair's reference teaches forming a first layer 360 on a silicon nitride layer 350 in a regular grating pattern having lines running along either an arbitrary x-axis or y-axis (Fig. 33, col. 11, lines 52-56). Moreover, in Adair's reference, the second layer is defined as "dog bone" shape and intersecting to the patterns of the first layer. The patterns of the "dog bone" shape second layer are distributed over each two adjacent patterns of the second layer and are regulative, as shown in Fig. 35. However, in claim 10, because the first line/space patterns include trenches having different lengths, the rectangle openings defined by the first line/space patterns and the second line/space patterns can be distributed non-uniformly.

For at least the foregoing reasons, Applicant respectfully submits that independent claims 1 and 10 are not anticipated by and patently define over the cited prior art references, and should be allowed. For at least the same reasons, their dependent claims 3, 4, 12-14 define over the prior art as well.

Applicants respectfully traverse the 102(e) rejection of claims 1-3, 5, 7-12, 14-16 because Hwang et al. (U.S. 6664028) does not teach every element recited in these claims.

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Hwang discloses a method of forming openings by forming a first patterned photoresist layer with parallel strips spaced from each other with a pitch/size and then forming a second patterned photoresist layer with parallel strips spaced from each other with a pitch/size on the first patterned photoresist layer. Wherein the first photoresist layer and the second photoresist layer are perpendicular to each other (Fig. 1B, col. 2, lines 8-26). However, Hwang does not disclose the method is used for Mask ROM coding as recited in claim 1. Besides, the openings defined by the first layer and the second layer of Hwang are regulated patterns. Hence, the method of Hwang can not be used for Mask ROM coding because coding windows of a Mask ROM may not be distributed uniformly.

Furthermore, in Hwang's reference, the first patterned photoresist layer and the second patterned photoresist layer are both parallel strips spaced from each other with a pitch/size. Hwang does not teach the first line/space patterns of the first photoresist layer include trenches having different lengths. Hence, claim 10 can not be anticipated by Hwang.

For at least the foregoing reasons, Applicant respectfully submits that independent claims 1 and 10 are not anticipated by and patently define over the cited prior art references, and should be allowed. For at least the same reasons, their dependent claims 2-3, 5, 7-9, 11-12, 14-16 define over the prior art as well.

Applicants respectfully traverse the rejection of claim 6 under 103(a) as being unpatentable over Adair or Hwang in view of Furukawa (U.S. 6303272), the rejection of claim 17 under 103(a) as being unpatentable over Hwang in view of Ng (U.S. 5876903), and the rejection of claim 18 under 103(a) as being unpatentable over Hwang in view of Furihata (U.S. 5618892).

Applicants submit that, as disclosed above, Adair or Hwang fails to teach or suggest each and every element of claims 1, 10, from which claims 6, 17 and 18 depend. Furukawa, Ng, and Furihata cannot cure the deficiencies of Adair and Hwang. Therefore, claims 1 and 10 are patentable over Adair, Hwang, Furukawa, Ng, and Furihata. For at least the same reasons, their dependent claims 6, 17 and 18 are also patentable.

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New Claims

New claims 19-20, depending from claims 1 and 10 respectively, recite that the trenches of the first line/space have rounded corners (as described in section [0027]). In Hwang and Adair, the patterns of the first layer lack the rounded corners.

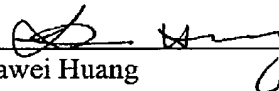
CONCLUSION

For at least the foregoing reasons, it is believed that the pending claims 1-12, 14-20 are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

Date: 3/18/2004

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